REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Change to military drawing format. Changes to output adjustment range. Add conditions for load regulation test at -55°C and +125°C. Change group A subgroups for load regulation and line regulation tests, and output voltage temperature coefficient. Add vendor CAGE 64155. Editorial changes throughout.	88-03-17	M. A. Frye
B	Add vendor CAGE 07933. Add vendor CAGE 54186. Add case outline 2. Change output voltage temp. co. test limits.	89-04-12	M. A. Frye
C	Add device type 02. Editorial changes throughout. Delete vendors CAGEs 54186 and 07933. Add vendor CAGE 1ES66.	92-11-25	M. A. Frye

THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

CURRENT CAGE CODE 67268

REV																		
SHEET																		
REV																		
SHEET																		

REV STATUS OF SHEETS														
REV	C	C	C	C	C	C	C							
SHEET	1	2	3	4	5	6	7							

PMIC N/A

STANDARDIZED MILITARY DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

PREPARED BY
Joseph A. Kerby

CHECKED BY
Ray Monnin

APPROVED BY
Michael A. Frye

DRAWING APPROVAL DATE
86-03-08

REVISION LEVEL
C

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, LINEAR, PLUS 5-VOLT ADJUSTABLE PRECISION VOLTAGE REFERENCE, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	14933	85514

SHEET 1 OF 7

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown in the following example:

85514	01	G	X
Drawing number	Device type (see 1.2.1)	Case outline (see 1.2.2)	Lead finish (see 1.2.3)

1.2.1 Device types. The device types shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	REF02A	Precision reference +5 volt adjustable output
02	REF02	Precision reference +5 volt adjustable output

1.2.2 Case outlines. The case outlines shall be as designated in MIL-STD-1835 and as follows:

Outline letter	Descriptive designator	Terminals	Package style
G	MACY1-X8	8	Can
P	GDIP1-T8 or CDIP2-T8	8	Dual-in-line
2	CQCC1-N20	20	Square leadless chip carrier

1.2.3 Lead finish. The lead finish shall be as specified in MIL-M-38510. Finish letter "X" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

1.3 Absolute maximum ratings.

Input voltage	40 V dc
Power dissipation (P_D)	500 mW 1/
Output short circuit duration	Indefinite
Storage temperature	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Junction temperature (T_J)	+150°C
Thermal resistance, junction-to-case (Θ_{JC})	See MIL-STD-1835

1.4 Recommended operating conditions.

Ambient operating temperature range (T_A)	-55°C to +125°C

1/ Derate 7.1 mW/°C above +80°C for the "G" package, 6.6 mW/°C above +75°C for the "P" package, and 7.8 mW/°C above +72°C for the "2" package.

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and bulletin. Unless otherwise specified, the following specification, standards, and bulletin of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARDS

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.
MIL-STD-1835 - Microcircuit Case Outlines.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawings (SMD's).

(Copies of the specification, standards, and bulletin required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 1.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full ambient operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-EC prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DESC-EC shall be required in accordance with MIL-STD-883 (see 3.1 herein).

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Device Type	Group A subgroups	Limits		Unit
					Min	Max	
Quiescent supply current	I_{SY}	No load	ALL	1		1.4	mA
				2, 3		2.0	
Output adjustment range	ΔV_{TRIM}	R_p = 10 kΩ T_A = +25°C	ALL	1	±3.0		%
Output voltage	V_O	I_L = 0 mA	01	1	4.985	5.015	V
			02	1	4.975	5.025	
			01	2, 3	4.978	5.022	
			02	2, 3	4.953	5.047	
Short circuit current	I_{OS}	V_O = 0 V T_A = +25°C	ALL	1	+15	+60	mA
Sink current	I_S	T_A = +25°C	ALL	1	-0.3		mA
Load regulation	LD reg	I_L = 0 to 10 mA 2/	ALL	1		0.01	%/mA
		I_L = 0 to 8 mA 2/	01	2, 3		0.012	
			02	2, 3		0.015	
Line regulation	LN reg	V_{IN} = 8 V to 33 V 2/	01	1		0.010	%/V
			02	1		0.012	
			ALL	2, 3		0.015	
Load current	I_L	T_A = +25°C 3/	ALL	1	10		mA
Output voltage noise	e_{np-p}	0.1 Hz to 10 Hz	ALL	4		18	µVp-p
Output voltage temperature coefficient	TCV_O	$-55°C \le T_A \le +125°C$ 4/	01	7, 8		±8.5	ppm/°C
			02			±25	

1/ V_{IN} = 15 V.

2/ Line and load regulation specifications include the effect of self-heating.

3/ Minimum of 10 mA load current guaranteed by load regulation test.

4/ $$TCV_O = \frac{V_{MAX} - V_{MIN}}{5\ V} \quad \frac{(-55°C \text{ to } +125°C)\ 1 \times 10^6}{+180°C}$$

Device type	01, 02	01, 02	01, 02
Case outline	G	P	2
Terminal number	Terminal symbol	Terminal symbol	Terminal symbol
1	NC	NC	NC
2	V_{IN}	V_{IN}	NC
3	TEMP	TEMP	NC
4	GND	GND	NC
5	TRIM	TRIM	V_{IN}
6	V_{OUT}	V_{OUT}	NC
7	NC	NC	TEMP
8	NC	NC	NC
9	- - -	- - -	NC
10	- - -	- - -	GND
11	- - -	- - -	NC
12	- - -	- - -	TRIM
13	- - -	- - -	NC
14	- - -	- - -	NC
15	- - -	- - -	V_{OUT}
16	- - -	- - -	NC
17	- - -	- - -	NC
18	- - -	- - -	NC
19	- - -	- - -	NC
20	- - -	- - -	NC

FIGURE 1. Terminal connections.

3.9 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.

(2) T_A = +125°C, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 6, 9, 10, and 11 in table I, method 5005 of MIL-STD-883 shall be omitted.

4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test conditions, method 1005 of MIL-STD-883.

(1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.

(2) T_A = +125°C, minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	- - -
Final electrical test parameters (method 5004)	1*, 2, 3, 4
Group A test requirements (method 5005)	1, 2, 3, 7, 8
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroup 1.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DESC-EC, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-EC, Dayton, Ohio 45444, or telephone (513) 296-5377.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-EC.

STANDARDIZED MILITARY DRAWING SOURCE APPROVAL BULLETIN

DATE: 92-11-25

Approved sources of supply for SMD 85514 are listed below for immediate acquisition only and shall be added to MIL-BUL-103 during the next revision. MIL-BUL-103 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DESC-EC. This bulletin is superseded by the next dated revision of MIL-BUL-103.

Standardized military drawing PIN	Vendor CAGE number	Vendor similar PIN 1/
8551401GX	06665 64155 1ES66	REF-02AJ/883 REF-02AH/883 REF02AJ/883B
8551401PX	06665 64155 1ES66	REF-02AZ/883 REF-02AJ8/883 REF02AZ/883B
85514012X	06665	REF-02ARC/883
8551402GX	1ES66	REF02J/883B
8551402PX	1ES66	REF02Z/883B
85514022X	1ES66	REF02RC/883

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE number	Vendor name and address
06665	Analog Devices Precision Monolithics Division 1500 Space Park Drive Santa Clara, CA 95050
64155	Linear Technology Corporation 1630 McCarthy Boulevard Milpitas, CA 95035-7487
1ES66	Maxim Integrated Products 120 San Gabriel Dr. Sunnyvale, CA 94086

The information contained herein is disseminated for convenience only and the Government assumes no liability whatsoever for any inaccuracies in this information bulletin.